Space Weather Forecast

Issued on Saturday, 04 November 2023 at 13:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/G2 Minor/Moderate geomagnetic storms expected and chance of G3/Strong storming on 05 and 06 Nov due to CME (coronal mass ejection) arrival. Chance of Moderate Class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with only C-class flare activity in the past 24 hours. There are seven sunspots on the visible disc. The two most interesting and largest spots reside in the southeastern quadrant at present. All other regions are small and simple.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been at background levels. Total magnetic field strength has been weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 0-2) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained close to background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is expected, with a chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: Two coronal mass ejections feature in the forecast, one from the 2 Nov which may arrive late 4 or early 5 Nov, and another from 03/0430 UTC which is expected to arrive later on the 05 Nov.

Solar wind speeds are slow currently. The next enhancements are expected from the two upcoming coronal mass ejections late day 1 into day 2 (04-05 Nov), followed by a coronal hole high speed stream which may enhance solar wind speeds to strong, from later on day 3 or more likely day 4 (06-07 Nov).

Quiet geomagnetic activity expected initially. Unsettled to Active conditions and a slight chance of G1/Minor Storms possible during the latter part of day 1 (04 Nov) or more likely early day 2 (05 Nov). Later day 2 (05 Nov) and early day 3 (06 Nov) G1/G2 Minor/Moderate storm intervals are expected with a chance of G3/Strong storms due to the arrival of the large coronal mass ejection from 03 Nov. Later day 3 and 4 into day 4 (6-7 Nov) will likely see geomagnetic activity remain Unsettled to Active with a chance of G1/Minor storms due to the expected arrival of the coronal hole high speed stream.

UK Aurora Forecast: Aurora sightings are expected to be minimal at first. From late day 1 (04 Nov) onward, geomagnetic activity is likely to become enhanced with a glancing coronal mass ejection. The chance of visible aurora increases significantly later on day 2 (05 Nov), as a further large coronal mass ejection arrives, sightings perhaps as far south as central or northern England/Wales, should the peak of the storms arrive in the evening or overnight in any clear spells.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at around background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	80	70	30
Strong	G3	No	1	30	30	1
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	35	35	35	35
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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